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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,445	02/13/2001	Jack H. Winters	2455-4376US2	9556
7590	07/12/2005		EXAMINER PHAN, MAN U	
S.H Dworetsky Room 2A-207 One AT&T Way Bedminster, NH 07921			ART UNIT 2665	PAPER NUMBER
DATE MAILED: 07/12/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/781,445

Applicant(s)

WINTERS ET AL.

Examiner

Man Phan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Amendment and Argument

1. This communication is in response to applicant's 04/14/2005 Amendment in the application of Winters et al. for the "System and method for selecting a transmission channel in a wireless communication system that includes an adaptive antenna array" filed 02/13/2001. The amendment and response has been entered and made of record. Claims 1-22 are pending in the present application.

2. Applicant's remarks and argument to the rejected claims are insufficient to distinguish the claimed invention from the cited prior arts or overcome the rejection of said claims under 35 U.S.C. 103 as discussed below. Applicant's argument with respect to the pending claims have been fully considered, but they are not persuasive for at least the following reasons.

3. In response to applicant's argument that the combination of cited references fails to present a prima facie case of obviousness. In response, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). It is not necessary that a "prima facie" case of unpatentability exist as to the claim in order for "a substantial new question of patentability" to be present as to the claim. Thus, "a substantial new question of patentability" as to a patent claim could be present even if the examiner would not necessarily reject the claim as either fully anticipated by, or obvious in view

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of, the prior art patents or printed publications. As to the importance of the difference between “a substantial new question of patentability” and a “prima facie” case of unpatentability see generally *In re Etter*, 756 F.2d 852, 857 n.5, 225 USPQ 1, 4 n.5 (Fed. Cir. 1985). Also, See MPEP § 2141.01(a) for a discussion of analogous and nonanalogous art in the context of establishing a prima facie case of obviousness under 35 U.S.C. 103. See MPEP § 2131.05 for a discussion of analogous and nonanalogous art in the context of 35 U.S.C. 102. 904.02.

In response to Applicant’s argument that there is no suggestion to combine the references, i.e., Alamouti and Kapoor as proposed in the office action. The Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. *In re Nomiya*, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin*, 170 USPQ 209 (CCPA 1971). It must be recognized that any judgement on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant’s disclosure, such a reconstruction is proper. *In re McLaughlin*, 443, F.2d 1392; 170 USPQ 209 (CCPA 1971).

Examiner notes that the Alamouti references was cited and included on the office action mailed 06/15/2004, and there is no need to include it again in the office action mailed 01/18/2005. Also, the Alamouti publication was issued as U.S. Patent No. 6,853,629 on

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02/08/2005 while the Office Action was mailed on 01/18/2005. However, Alamouti 's Patent 6,853,629 will be cited on PTO-892 of this Office Action.

Applicant's argument with respect to the rejected claim 1 (page 3, second paragraph) that the cited references do not disclose "*channel selection mechanism*" (page 4, second paragraph). However, Alamouti et al. (US#6,853,629) teaches the Channel Measurements which in order for the best channel to be chosen, the RUs must make measurements on some number of channels and report the results to the base station for use in *selecting the best channel for an RU* when a link is established (*channel selection process based on performance at the receivers*). These measurements include RSSI and SINR. Table 3.1 shows a gross look at how received signal strength indicator (RSSI) and signal to interference ratio (SINR) information could be used to assign channels to incoming RUs. (Col. 22, lines 65 to Col. 24, lines 45). Alamouti further teaches the steps of computing a channel candidacy assessment factor (CAF) for each of the multiple channels based on the received information; and where the channel candidacy assessment factor (CAF) for at least one of the multiple channels is acceptable, *selecting the channel with the most favorable CAF* (Col. 32, lines 30 plus). Furthermore, Kapor discloses a diversity combining (SDC) technique may be used by measuring the instantaneous SNR for each sub-array's output and selecting the "best" option each symbol time (*selection combining technique*) (Col. 5, lines 10 plus and Col. 23, lines 15 plus). It's noted that, to improve signal quality on both links, a mobile station measures interference on the candidate channels and selects a channel with sufficiently low interference, thus achieving good quality in both directions. This process is considered well known, and admitted as prior art. Therefore, the

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Examiner maintains that the references cited and applied in the last office actions for the rejection of the claims are maintained in this office action.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 2, 5-9 and 10, 11, 14-18 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al. (US#6,853,629) in view of Kapoor et al. (US#6,795,424).

With respect to claims 1 and 20, 22, both Alamouti et al. (US#6,853,629) and Kapoor et al. (US#6,795,424) disclose a method and system for establishing a wireless communication utilizing diversity combining techniques, according to the essential features of the claims. Alamouti discloses a wireless communication system including a receiver having an adaptive array with at least two antennas to receive a signal and produce at least two received signals (Col. 26, lines 66 plus), a transmitter having at least two transmission channels for communicating the signal from the transmitter to the receiver (Col. 19, lines 44 plus), means for suppressing interference at the receiver by applying an interference suppression technique (Col. 21, lines 56 plus) and means for selecting a channel (Col. 22, lines 65 plus and Col. 26, lines 65 plus). Alamouti do not disclose expressly wherein channel performance be based on a combining technique that differs from the interference suppression technique. However, Alamouti teaches a polarization diversity in various unique combinations for improved fade resistance and to enable a base station to efficiently communicate with many remote stations (See Fig. 1, Col. 9, lines 20 – Col. 11, lines 54 and Col. 19, lines 28 plus). In the same field of endeavor, Kapoor et al. (US#6,795,424) discloses in Fig. 5 a block diagram of an exemplary embodiment of a receiver 60 for the adaptive antenna array architecture 10. The receiver 60 is capable of correcting for incoming channels which experience fast time-varying fading. The receiver 60 illustrates two stages of an array. Signals from mobile users 51 impinge upon the adaptive array 52 comprised of a plurality of sub-arrays 59 numbered 0 to M. Each sub-array 59 comprises a plurality of elements 54 numbered 0 to S. The number of elements 54 in each sub-array 59 may not be equal. Each sub-array 59 can handle signals from many mobile users 51 at the same time. At each sub-array 59, the signals from mobile users 51 pass through

coherent demodulators to beamformers 56 which are supplied with direction of arrival data from the DOA processor 57 in the BS 7 to construct the desired signal response pattern. The DOA processor 57 calculates the direction of arrival in accordance with the method described above in connection with Fig. 3. The output signals from the beamformers 56 are passed through a spatial diversity combiner 58 to remove interference. The output signal from the spatial diversity combiner 58 may be fed into a standard voice or data network (Col. 3, lines 32 plus and Col. 18, lines 50 plus).

It's noted that the effects of fading dips can be mitigated by having multiple receive antennas and by employing some form of diversity combining, such as selective combining, equal gain combining, or maximal ratio combining, wherein signals from each receive antenna are combined to create a single received signal. Diversity techniques take advantage of the fact that the fading on the different antennas is not the same, so that when one antenna receives a fading dip, chances are, another antenna is not. Note Mobile Communications Design Fundamentals by William C. Y. Lee, Howard W. Sams & Co., Ind., USA. In section 3.5.1 of this book, several examples are given describing how signals from two receiver amplifiers with separate antennas can be combined to counteract fading.

Diversity systems are used for fading compensation (See, D. G. Brennan, "Linear diversity combining techniques", Proc. of IRE, Vol. 47, pp. 1075-1102, June 1959.). In a dual diversity system, one symbol is transmitted over two channels and respective signals are combined at a receiver. There are several types of diversity combining techniques in practical use: selection combining (SC), equal gain combining (EGC), and maximal ratio combining (MRC). In the SC technique, a channel with the largest signal to noise ratio is selected. SC is

simply implemented with orthogonal signaling and noncoherent demodulation which are frequently used in fading channels (G. Chyi, J. G. Proakis, and C. M. Keller, "On the symbol error probability of maximum selection diversity reception schemes over a Rayleigh fading channel", IEEE Trans. Commun. Vol. 37, No. 1, pp. 78-83, January 1989.). The most efficient communication system design for M-ary orthogonal channels with noncoherent demodulation would employ low rate codes over a Galois field $GF(q)$ with $M=q$ (W. E. Ryan and S. G. Wilson, "Two classes convolutional codes over $GF(q)$ for q-ary orthogonal signaling", IEEE Trans. Commun. Vol. 39, No. 1, pp 30-40, January 1991.).

Regarding claim 2, Alamouti discloses that the receiver must distinguish among different beams within its own cell and signals from other bases (Col. 23, lines 7 plus). This meets the limitation of a receiver that is able to communicate with multiple transmitters.

Regarding claims 5-9, Alamouti discloses using a measurement of mean-square error for deriving an optimal beamform solution (Col. 22, lines 15 plus). The beamforming is what provides the interference suppression (Col. 21, lines 56 plus). Alamouti also discloses maximal ratio, selection diversity and equal gain as possible combining techniques to be used at the receiver antenna array (Col. 27, lines 24 plus). Furthermore, Kapoor discloses using switched diversity combining at a receiver by measuring the instantaneous SNR for each sub-array's output and selecting the best option each symbol time (*channel selection based on performance at the receivers*). Kapoor teaches the use of an Adaptive Array (AA) with the elements spaced far apart (5 to 15 wavelengths) to obtain spatial diversity, i.e., independent fading at different antenna elements. The combining method of the preferred embodiment uses maximal ratio combining (MRC) to correct for IBI and Additive white Gaussian noise

(AWGN). The MRC is merely a spatial matched filter. If an M element array is used, each bin has a separate M dimensional combining weight vector. To implement MRC, the channel frequency response for each bin may be estimated via periodic pilot sub-symbols. Note that the MRC also subsumes the role of the standard frequency equalization (FEQ) operation (Col. 3, lines 47-53 and Col. 4, lines 27 plus). It's noted that the technique of reducing fading fluctuation is called the diversity combining method, which comes in three basic types, namely, selection combining, equal-gain combining and maximum-ratio combining. In the selection combining, in particular, the least degraded signal is selected and outputted from a plurality of received signals, and the other signals are not used. The selection combining is considered to best serve a practical purpose because the circuit structure of this selection combining is simpler than those of the other two combining methods. Such diversity combining techniques may include Equal Gain Combining (EGC), Maximal Ratio Combining (MRC), Interference Rejection Combining (IRC), etc.

Regarding claims 10, 11, 14-18 and 19, 21, they are method claims corresponding to the apparatus claims 1, 2, 5-9 and 20, 22 above. Therefore, claims 10, 11, 14-18 and 19, 21 are analyzed and rejected as previously discussed with respect to claims 1, 2, 5-9 and 20, 22 above.

One skilled in the art would have recognized the need for effectively and efficiently facilitates operating of the antenna diversity combining techniques in selecting transmission channel, and would have applied Kapoor's novel use of the diversity combining techniques with adaptive array into Alamouti's adaptive antenna array communications system. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Kapoor's method and apparatus for interference suppression in OFDM wireless

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communication systems into Alamouti's Method for frequency division duplex communications with the motivation being to provide a method and system for establishing a wireless communication utilizing diversity combining techniques.

7. Claims 3-4 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al. (US#6,853,629) in view of Kapoor et al. (US#6,795,424) as applied to the claims above, and further in view of Bevan et al. (US#6,415,149).

With respect to claims 3, 4, Alamouti and Kapoor disclose the claimed limitations as discussed in the paragraph 6 above. In the same field of endeavor, Bevan discloses a softer handoff procedure in which the base station uses a diversity combiner to combine signals received from a mobile station in two different sectors (col. 7, lines 29-43). This meets the limitation of a mobile station that acts as a transmitter that transmits on at least two transmission channels.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the softer handoff procedure of Bevan wherein the mobile station communicates with a base station array receiver over two transmission channels, and Kapoor's novel use of the diversity combining techniques with adaptive array into Alamouti's adaptive antenna array communications system. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Bevan's Method and apparatus for handoff in a cellular radio communications system, and Kapoor's method and apparatus for interference suppression in OFDM wireless communication systems into Alamouti's Method for frequency division duplex communications with the motivation being to

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provide a method and system for establishing a wireless communication utilizing diversity combining techniques.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Chuang et al. (US#6,052,594) is cited to show the system and method for dynamically assigning channels for wireless packet communications.

The Chuang et al. (US#5,212,831) is cited to show the method and apparatus for autonomous adaptive frequency assignment in TDMA portable radio systems

The Chang et al. (US#5,822,681) is cited to show the method for assigning band port channels in an unlicensed personal communications system.

The Winters (US#5,481,570) is cited to show the block radio and adaptive arrays for wireless systems.

8. **THIS ACTION THIS ACTION IS MADE FINAL.** See MPEP ' 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR

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1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (571) 272-3149. The examiner can normally be reached on Mon - Fri from 6:00 to 3:00.

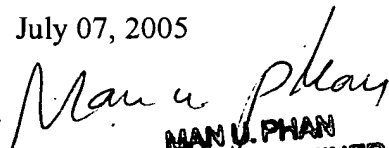
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at toll free 1-866-217-9197.

Mphan

July 07, 2005


MAN U. PHAN
PRIMARY EXAMINER